
Neurogenic radial glia in the outer subventricular zone of human neocortex.

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Public Summary:

Scientific Abstract:

Neurons in the developing rodent cortex are generated from radial glial cells that function as neural stem cells. These epithelial cells line the cerebral ventricles and generate intermediate progenitor cells that migrate into the subventricular zone (SVZ) and proliferate to increase neuronal number. The developing human SVZ has a massively expanded outer region (OSVZ) thought to contribute to cortical size and complexity. However, OSVZ progenitor cell types and their contribution to neurogenesis are not well understood. Here we show that large numbers of radial glia-like cells and intermediate progenitor cells populate the human OSVZ. We find that OSVZ radial glia-like cells have a long basal process but, surprisingly, are non-epithelial as they lack contact with the ventricular surface. Using real-time imaging and clonal analysis, we demonstrate that these cells can undergo proliferative divisions and self-renewing asymmetric divisions to generate neuronal progenitor cells that can proliferate further. We also show that inhibition of Notch signalling in OSVZ progenitor cells induces their neuronal differentiation. The establishment of non-ventricular radial glia-like cells may have been a critical evolutionary advance underlying increased cortical size and complexity in the human brain.

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